

**SECRET**

Dear Bob,

Sept 8 9

Here is some info on a subject about which you may not be aware and which in any event is not I believe of great importance to you. It is of importance to ~~of~~ some other stations for ~~the~~ reasons which you will see as we go along so I think we should all be familiar with it..

All electrical equipment such as teletype machines, TOTs, tk's, some switchboards, the SIGCUM the 1700 and so on give out various types of radio waves when they are operated. Of course, in the case of many of these machines the radio waves are small in power ~~of power~~ and so don't go very far. Then again if there are a lot of them going at once they interfere with each other and no recognizable signal can be picked up. Then again even if the signal that is given out carries for some distance the situation may be such, as for instance at Caserta, where we had means of knowing whether there were people around within the distance ~~of~~ of danger setting up recording equipment. (I think tho that Caserta as a bad example to give on that score as the recording apparatus is not large and could possibly have been set up in the woods up the hill without discovery.

Well, as you can see there are a lot of factors which may prevent any danger as a practical matter arising regardless of the fact that plain text signals may be given out. Not all the above instruments give out plain text. It all depends at what points in the coding process any arcing or sparks occur. For instance, in the case of the TK, the decode process produces a strong plain text signal whereas in encode there is no recognizable signal unless the plaintext tape is cut independently of the coding process.

For your info I will list the various instruments that I know of and the nature of the signals they give out:

ABA, BERTHA, 1700 - only operating signals (that is neither plain nor cipher radio waves, just a routine signal that is the same for every turnover of the machine.)

SIGCUM - A considerable plaintext signal (more on this later.)

TOT - cipher text signals are radiated. In addition if the relay which is used for remote control (as in conference work) is used a strong plain text signal is emitted.

TK - see above. The plain text signal is mixed with certain operating signals but is distinguishable.

RUWED - Only operating signals

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SWITCHBOARDS - No tests made in most cases. The BD-100 gives a strong signal duplicating whatever is put thru it, plain or cipher text.

TELETYPE MACHINES - It is a fact that all teletype machines (if not suppressed) give out a weak to medium signal which duplicates whatever is being typed. (The Western Union teletypes give a much stronger signal than the Teletype Corp.)

How strong are these signals? Well they range up to about the maximum (TK decode, BD - 100) of 400 microvolts per meter, which means that under favorable conditions the signal could be heard with relatively simple, portable equipment and recorded at a distance of 20 to 25 yards.

An exception is the SIGCUM which it is claimed by the Bell Lab people although we made no tests ourselves can be heard at great distances. (Again more later on this.)

Bob, note that these radio type signals are of no especial wave lengths but rather of all wave lengths although any special machine may have its own frequency or a number of them at which it can be heard better.

Note this too. That in every case it is possible to suppress the signal by appropriate use of suppressors, condensers, shielding of the wires and so on. You have to have a competent radio technician though to do this and since the waves are given out at any and all frequencies he has to actually test the whole damn spectrum from top to bottom and practically into sound wave frequency. The Bell people told us how they thought they had worked out suppression for one machine and then found one single set of waves getting away which would have spoiled the whole thing.

Not only will the use of proper suppressors and so on fix any machine but also the use of a radio ~~proof~~ proof cage will work fine if all the wires that run out have traps on them. We actually built one for our TK and it worked like a charm but we had to run around and test it very carefully first because one wire running out of the thing which is not taken care of will undo all your work.

You will notice I spoke of the importance of wires. Some of the frequencies involved have a great affinity for any wires that are in the room and will get onto the wires and run down them for great distances. Further they will radiate from the wires so that they can be picked up by induction from near the wires. That is the problem with the SIGCUM because the Bell people insisted that plaintext ran right down the wire along with the cipher text but that the timing was such that you could keep them separate from each other in the recording and so read the traffic a number of miles from the origination point. I do not find the Army is very excited about this point on the CUM but am inclined to believe

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the Bell people over the Army because some of the young officers who had been working on this at Arlington were worried and because Bell doesn't say it can do a thing if it can't.

It was the wires in the case of the TK that were the real danger. Completely unsurpressed we could hear the plaintext not much more than 10 or 15 feet outside of our basement on the road. But the signal got onto the telephone wires and ran down them so that you could hear very plainly up by Central and North buildings and presumably considerably further even though we were taking the signals off by induction at a point perhaps six to 10 feet from the wires themselves.

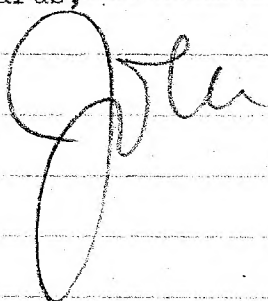
The point in all this is not so much that there is a serious danger in every station but rather that there is a possibility of danger the extent of which must be realized in order to determine whether anything need be done. If something is to be done we have no one to cope with it ourselves and have to call in a radio research man to help.

Bob, all teletype Corp teletypes are automatically equipped with a good degree of suppression. Western Union ones are not. But after some experimenting the WU Co got up a set of shields and suppressors which completely annihilated the TK signals.

I don't recommend the cage idea. We, as I say tried it out, but unless one big enough for a whole room is built (in which case all telephone, power and light lines have to be shielded and trapped) the personnel feel cooped up and it is not very satisfactory.

Well, that's the story. Am knocking off for supper now. Will be expecting you back soon.

Regards,



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